

**REPORT ON THE JANUARY 1, 2005
ACTUARIAL VALUATION OF THE
MASSACHUSETTS WATER
RESOURCES AUTHORITY
CONTRIBUTORY RETIREMENT SYSTEM**

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SECTION I - OVERVIEW

The MWRA Retirement Board engaged Buck Consultants to prepare an actuarial valuation of the Retirement System as of January 1, 2005. Employee data and asset information as of this date were provided by the Retirement Board.

The valuation was prepared pursuant to MGL Chapter 32, based upon the acceptance of Section 22D.

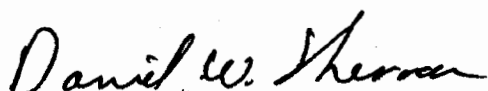
The purposes of the valuation are to:

- 1) analyze the current funded position of the System and determine the level of contributions necessary to assure sound funding;
- 2) update the Section 22D funding schedule currently in place for the Retirement System; and
- 3) provide reporting and disclosure information for financial statements, governmental agencies and other interested parties.

Section II provides a summary of the principal valuation results. Section V provides a projection of the Section 22D funding amounts. Schedule B of this report outlines the actuarial assumptions and methods.

Respectfully Submitted,

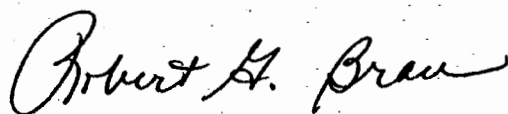
BUCK CONSULTANTS



Daniel Sherman, ASA, MAAA, EA
Associate Principal, Actuary

August 10, 2005

Date



Robert G. Brau, CEBS
Senior Consultant, Actuary

August 10, 2005

Date

SECTION II - SUMMARY OF PRINCIPAL RESULTS

1. For convenience of reference, the principal results of the valuation as of January 1, 2005 are summarized below along with a comparison with the amounts in the previous valuation as of January 1, 2003.

Valuation Date	January 1, 2005	January 1, 2003
a) Active members:		
Number	1,150	1,205
Annual compensation	\$ 65,789,878	\$ 66,710,911
Average age	46.4	45.3
Average service	12.4	11.4
Average compensation	\$ 57,209	\$ 55,362
b) Pensioners and beneficiaries:		
Number	227	173
Annual benefit payments	\$ 4,798,917	\$ 2,665,762
Average benefit	\$ 21,141	\$ 15,409
c) Disability retirements:		
Number	28	20
Annual benefit payments	762,716	\$ 392,657
Average benefit	27,240	\$ 19,633
d) Inactive employees		
Number	174	139
Accumulated employee contributions	\$ 5,086,608	\$ 3,607,000
e) Market value of plan assets	\$ 176,583,717	\$ 121,823,453
f) Actuarial value of plan assets	\$ 172,511,736	\$ 146,188,144
g) Unfunded actuarial liability	\$ 0	\$ 0
h) Funded percentage	100.0%	100.0%
i) Section 22D funding for fiscal 2006	\$ 3,975,452	\$ 3,975,452
j) Section 22D funding for fiscal 2007	\$ 4,053,207	\$ 4,174,225

2. A projection of Section 22D costs is presented in Section V.
3. Schedule B of this report outlines the full set of actuarial assumptions and methods used in the valuation.
4. The provisions of the System are summarized in Schedule C.

SECTION III - MEMBERSHIP DATA

1. In order to calculate the aggregate liabilities on account of members of the System as of January 1, 2005, data for each active member, inactive member, retired member and beneficiary of the System were furnished to the actuary on diskette by the Retirement Board.
2. Tables showing, as of January 1, 2005, the number and annual compensation of members classified by age and years of service and the number and annual retirement allowances of retired members and beneficiaries classified by age are presented in Schedule D.

SECTION IV - ASSETS

1. The amount of assets taken into account in this valuation is based on financial information reported by the Retirement Board.
2. As of January 1, 2005, the reported market value of Retirement System assets amounted to \$176,583,717.
3. The actuarial value of plan assets, however, does not equal the market value of plan assets. Instead, the Board adopted an asset valuation method in 1999 that would "smooth" investment appreciation (depreciation) over a five-year period (as described in Schedule B). This "smoothing method" is in its fourth transition year moving towards a five-year smoothing period. The actuarial value of plan assets used in the valuation was \$172,511,736.

SECTION V - CONTRIBUTIONS PAYABLE UNDER THE SYSTEM

Section 22D of MGL Chapter 32 outlines various requirements of a funding schedule that will amortize the unfunded actuarial liability and cover normal costs. The normal cost and unfunded actuarial liability are to be calculated in accordance with the individual entry age normal actuarial cost method. Amortization of the unfunded actuarial liability is to be based on a schedule that ends no later than the year 2028. The contribution toward amortization of the unfunded actuarial liability may increase each year by 4½%.

The following table presents a projection of contributions which meet the Section 22D requirements. The contributions were computed assuming that the contribution will be paid in monthly installments starting July 1st. The normal cost is assumed to increase by 5% annually.

Please note that the Total Authority Contribution for the 2006 fiscal year was established by the 1/1/2003 actuarial valuation. Therefore, the valuation results shown in Schedule A (page 10) were used to derive the Total Authority Contributions for fiscal years ending in or after 2006.

**PENSION REFORM ACT - SECTION 22D
FUNDING REQUIREMENTS**

Fiscal Year Ending In	Normal Cost	Amortization of the Unfunded Actuarial Liability	Total Authority Contribution
2,006	3,975,452	0	3,975,452
2,007	4,053,207	0	4,053,207
2,008	4,255,867	0	4,255,867
2,009	4,468,661	0	4,468,661
2,010	4,692,094	0	4,692,094
2,011	4,926,698	0	4,926,698
2,012	5,173,033	0	5,173,033
2,013	5,431,685	0	5,431,685
2,014	5,703,269	0	5,703,269
2,015	5,988,433	0	5,988,433
2,016	6,287,854	0	6,287,854
2,017	6,602,247	0	6,602,247
2,018	6,932,359	0	6,932,359
2,019	7,278,977	0	7,278,977
2,020	7,642,926	0	7,642,926
2,021	8,025,073	0	8,025,073
2,022	8,426,326	0	8,426,326
2,023	8,847,643	0	8,847,643
2,024	9,290,025	0	9,290,025
2,025	9,754,526	0	9,754,526
2,026	10,242,252	0	10,242,252
2,027	10,754,365	0	10,754,365
2,028	11,292,083	0	11,292,083
2,029	11,856,687	0	11,856,687
2,030	12,449,522	0	12,449,522
2,031	13,071,998	0	13,071,998
2,032	13,725,598	0	13,725,598
2,033	14,411,877	0	14,411,877

SECTION VI - ACCOUNTING INFORMATION

Statements issued by the Government Accounting Standards Board (GASB) require disclosure of pension information in audited financial statements as follows:

	Normal Cost as of January 1, 2005	Percentage of Payroll
Normal cost for the employees	\$ 5,624,210	8.55%
Normal cost for the MWRA	3,637,492	5.53

Actuarial Accrued Liability as of January 1, 2005

Total actuarial liability	
Present active members	\$ 111,849,520
Present retired members and beneficiaries (includes inactive members)	<u>60,662,216</u>
Total	\$ 172,511,736
Assets	<u>(172,511,736)</u>
Unfunded actuarial accrued liability	\$ 0

Schedule of Funding Progress (\$,000)

Date	Actuarial Value of Assets	Actuarial Accrued Liability (AAL)	Unfunded AAL (UAAL)	Funded Ratio	Covered Payroll	UAAL as % of Covered Payroll
1/1/05	\$172,512	\$172,512	\$0	100%	\$65,790	0%
1/1/03	146,188	146,188	0	100%	66,711	0%
1/1/02	141,069	141,069	0	100%	66,322	0%
1/1/01	128,385	128,385	0	100%	65,955	0%
1/1/99	96,318	96,318	0	100%	66,782	0%
1/1/98	77,712	77,712	0	100%	63,579	0%
1/1/97	58,185	58,185	0	100%	60,120	0%
1/1/96	46,076	46,980	904	98%	56,660	2%

SCHEDULE A - RESULTS OF THE VALUATION

As of January 1, 2005

1.	Present value of prospective benefits payable in respect of:	
	Present retired members and beneficiaries	\$ 60,662,216
	Present active members	201,890,161
	Present inactive members	<u>5,086,608</u>
	Total actuarial liabilities	\$ 267,638,985
2.	Present value of future normal contributions by members and the Authority	\$ 95,127,249
3.	Accrued liability, 1. - 2.	\$ 172,511,736
4.	Assets	\$ 172,511,736
5.	Unfunded accrued liability	\$ 0
6.	Funded ratio, 4. ÷ 3.	100.0%
7.	Present value of future normal contributions, 2.	\$ 95,127,249
8.	Present value of future salaries	\$ 675,727,957
9.	Normal contribution rate, 7. ÷ 8.	14.0777%
10.	Annualized compensation	\$ 65,789,878
11.	Normal cost, 9. x 10.	\$ 9,261,702
12.	Member contributions during the year	\$ 5,624,210
13.	Authority normal cost, 1/1/2005, 11. - 12.	\$ 3,637,492
14.	Authority normal cost, 7/1/2006, line 13. increased 5% for 1.5 years and adjusted for monthly payments	\$ 4,053,207

SCHEDULE B - ACTUARIAL ASSUMPTIONS AND METHODS

VALUATION INTEREST RATE: 8% per annum, compounded annually, net of administrative expenses.

SEPARATIONS FROM ACTIVE SERVICE: Representative values of the assumed annual rates of disability, death, service retirement, salary scale and withdrawal are as follows:

Annual Rates of

Age	Disability	Death		Service Retirement		Years of Service	Salary Scale	Years of Service	Rates of Withdrawal
		Male	Female	Male	Female				
25	.02%	.04%	.02%			0	7.00%	0	15.0%
30	.03	.04	.03			1	6.50	1	12.0%
35	.06	.08	.05			2	6.50	2	10.0%
40	.10	.11	.07			3	6.00	3	9.0%
45	.15	.15	.11			4	6.00	4	8.0%
50	.19	.21	.17	1.0%	1.5%	5	5.50	5	7.6%
55	.24	.30	.25	2.0	5.5	6	5.50	10	5.4%
60	.28	.49	.39	12.0	5.0	7	5.00	15	3.3%
62	.30	.59	.47	30.0	15.0	8	5.00	20	2.0%
65	.30	.76	.58	40.0	15.0	9+	4.75	25	1.0%
69		.95	.73	30.0	20.0			30+	0.0%

COST-OF-LIVING ADJUSTMENTS: Retirement benefits were assumed to increase annually by 3%, up to a maximum of \$360.

DEATHS AFTER RETIREMENT: The RP-2000 Healthy Annuitant Table. For the period after disability retirement, the RP-2000 Healthy Annuitant Table set forward 2 years is used.

LOADING OR CONTINGENCY RESERVE: None.

ACTUARIAL COST METHOD: Aggregate cost method.

ASSET VALUATION METHOD: For contribution basis, assets are valued according to the following general formula, provided such value is within a 20% corridor of the market value:

$$VA = MV - .8A_1 - .6A_2 - .4A_3 - .2A_4$$

where

VA = Valuation assets.

MV = Market value of assets as of the valuation date.

A_n = Appreciation (depreciation), both realized and unrealized, during n^{th} year preceding the valuation date.

This smoothing method, however, is being phased in beginning with the 1999 year.

SCHEDULE C - SUMMARY OF SYSTEM PROVISIONS

MEMBERSHIP

The Retirement System covers all employees of the MWRA. Eligible employees in the Authority who enter service on or after the date the System became operative for their classification may become members of the Retirement System on their own application.

SUMMARY OF BENEFIT AND CONTRIBUTION PROVISIONS

A summary of the main benefit and contribution provisions of the Retirement System, as interpreted for the valuation, is presented below.

The terms "Group 1" and "Group 4" are used to denote "general employees" and "police and fire", respectively.

BENEFITS

Final Average Salary (FAS)

The average of a member's 3 highest consecutive years' compensation.

Superannuation Retirement

Eligibility

Age 65 for Group 1; Age 55 for Group 4. Maximum retirement age is 65 for Group 4 members who are employed in certain public safety positions. There is no maximum retirement age for Group 1 employees.

Allowance

2.5% per year of service times FAS. Maximum total allowance is 80% of FAS. Veterans receive additional \$15 annually per year of service to a maximum of \$300 annually.

Early Retirement

Eligibility 20 years of service.

Allowance Calculated as a superannuation retirement allowance (including veteran's benefits) except accrual rate is equal to 2.5% reduced by .1% for each year age at retirement is below either 65 for Group 1 or 55 for Group 4.

The minimum allowance after 30 years of service is equal to:

- (1) An annuity which is the actuarial equivalent of member's accumulated deductions; and
- (2) A pension equal to 1/3 of FAS and any veteran's benefits as described under superannuation retirement.

Vested Retirement

Eligibility 10 years of service. For certain involuntary terminations, this is reduced to 6 years.

Allowance A superannuation retirement allowance commencing at age 55 for Group 1 members and age 45 for some Group 4 members or later, where the accrual rate is determined by the age of the member at the time the allowance commences.

Ordinary Disability

Eligibility 10 years of service.

Allowance An immediate allowance equal to the age 55 rate for Group 1 members or age 45 rate for some Group 4 members per year of service times FAS.

Veterans receive an allowance equal to:

- (1) An annuity which is the actuarial equivalent of their accumulated deductions; and
- (2) A pension which is the greater of 50% of current salary and the service retirement allowance to which they are eligible, if any.

Accidental Disability

Eligibility

None.

Allowance

An immediate allowance equal to:

- (1) An annuity which is the actuarial equivalent of the member's accumulated deductions; and
- (2) A pension equal to 72% of current salary; and
- (3) A supplement equal to \$501.36 per year per child under 21.

The maximum total allowance is 100% of current salary.

Accidental Death Benefit

Eligibility

None.

Allowance

An immediate allowance equal to:

- (1) A lump sum payment equal to the accumulated deductions at death; and
- (2) A pension equal to 72% of current salary and payable to the surviving spouse, dependent children, or the dependent parents; and
- (3) A supplement of \$312 per year per child payable to the spouse or legal guardian until all children reach age 21, unless handicapped.

The maximum total allowance is 100% of current salary.

Death in Active Service

Eligibility

None.

Allowance

An immediate allowance that would have been payable had the member retired and elected the 2/3 joint and survivor option on the day before his death. For death occurring prior to the minimum superannuation retirement age, the age 55 and age 45 accrual rates are used, respectively, for Group 1 and Group 4 members.

For members with at least 2 years of service at death, the surviving spouse receives an additional allowance equal to the sum of \$1,440 per year for the first child and \$1,080 per year for each additional child.

The minimum allowance is \$250 per month. The maximum total allowance is 100% of salary at the date of death.

Normal Form of Benefit

Reduced modified cash refund annuity.

Optional Forms of Benefit

- (1) Life annuity.
- (2) Modified cash refund annuity.
- (3) 66-2/3% joint and survivor allowance.

Return of Contribution

If no other benefit is payable upon termination, the member's accumulated deductions are returned.

Post-Retirement Adjustments

Up to 3% of the annual retirement allowance up to a maximum of \$360 annually.

Member Contributions

Members contribute a percentage of annual regular compensation in accordance with their respective dates of hire, as shown below:

<u>Date of Hire</u>	<u>Rate of Contribution</u>
Prior to January 1, 1975	5%
On or after January 1, 1975	7%
On or after January 1, 1984	8%
On or after July 1, 1996	9%

Members hired on or after January 1, 1979 contribute an additional 2% of compensation in excess of \$30,000.

SCHEDULE D - MEMBERSHIP TABLES

TABLE 1

THE NUMBER AND ANNUAL COMPENSATION OF ACTIVE MEMBERS
DISTRIBUTED BY FIFTH AGE AND SERVICE
AS OF JANUARY 1, 2005

Age	Under 5		5 to 9		10 to 14		15 to 19		20 to 24		25 to 29		30 to 34		35 to 39		40 and up		Total	
	No.	Salary	No.	Salary	No.	Salary	No.	Salary	No.	Salary	No.	Salary	No.	Salary	No.	Salary	No.	Salary	No.	Salary
Under 25	8	237,944	8	308,712	3	157,974	9	463,563	1	58,169									8	237,944
25 to 29	16	579,806	35	1,684,417	26	1,377,493	69	3,711,694	7	340,922	2	109,177							27	1,046,492
30 to 34	19	1,011,770	40	2,373,659	59	3,253,517	111	6,440,224	7	529,494	6	551,478							89	4,537,244
35 to 39	26	1,312,343	43	2,465,582	64	3,885,440	89	5,547,496	7	532,676	6	457,137							195	10,709,383
40 to 44	26	1,252,088	35	2,148,014	69	4,101,551	78	4,655,046	9	235,940	7	525,596							253	14,493,434
45 to 49	29	1,522,041	23	1,485,005	49	2,988,999	42	2,819,956	3	78,647	1	47,614							235	14,400,074
50 to 54	19	975,666	19	1,031,243	30	1,680,654	10	467,387	1	32,458									185	11,159,257
55 to 59	8	390,004	6	350,245	13	873,113	2	29,209	1	28,932									112	6,879,264
60 to 64	5	251,064	2	119,081	2	29,209	1	32,458											35	2,020,445
65 to 69	2	127,513																	9	474,955
70 & up	-	-																	2	112,952
Total	158	7,660,259	211	11,976,957	316	18,376,824	409	24,137,824	29	1,823,460	21	1,643,388	3	188,977	2	172,308	1	91,446	1,150	66,071,444

TABLE 2
THE NUMBER AND ANNUAL ALLOWANCES
OF RETIRED MEMBERS AND BENEFICIARIES
AS OF JANUARY 1, 2005

AGE	SERVICE RETIREMENT		DISABILITY RETIREMENT		BENEFICIARIES		TOTAL	
	NUMBER	ALLOWANCE	NUMBER	ALLOWANCE	NUMBER	ALLOWANCE	NUMBER	ALLOWANCE
38			3	108,251			3	108,251
40			1	23,238			1	23,238
45			1	23,491			1	23,491
47			2	28,221			2	28,221
48			1	22,888	1	5,856	2	28,744
49			1	33,398			1	33,398
50	1	30,544					1	30,544
51			2	45,285			2	45,285
52			2	50,903			2	50,903
53	2	29,176	1	16,945			3	46,121
54	2	63,673					2	63,673
55	4	96,858	2	64,602	1	22,356	7	183,816
56	2	59,608	2	44,726			4	104,335
57	10	302,184	2	70,149	2	10,598	14	382,931
58	14	347,349	2	41,580			16	388,929
59	16	351,420	1	48,362	1	23,247	18	423,030
60	14	364,181					14	364,181
61	15	292,464	1	28,295			16	320,758
62	7	145,008	3	89,273			10	234,281
63	10	225,598			1	15,495	11	241,093
64	7	110,645					7	110,645
65	19	396,114					19	396,114
66	13	286,710			1	9,641	14	296,351
67	10	187,077			1	6,527	11	193,605
68	15	308,201					15	308,201
69	7	187,357					7	187,357
70	7	127,995					7	127,995
71	12	252,258					12	252,258
72	6	106,938			1	6,023	7	112,961
73	5	86,209					5	86,209
74	8	168,155	1	23,109			9	191,264
76	1	14,051			1	5,296	2	19,347
77	1	29,020					1	29,020
78	3	51,823					3	51,823
79	1	8,568					1	8,568
80	2	20,367					2	20,367
81	3	44,326					3	44,326
	217	4,693,878	28	762,716	10	105,039	255	5,561,633